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⑮ 水質汚濁防止循環混合気体水噴射ポンプ浚せ
つ工法

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明 細 書

1. 発明の名称

水質汚濁防止循環混合気体水噴射ポンプ浚せ
つ工法

2. 特許請求の範囲

循環高圧泥水噴射ポンプ 3. 毎分 800~2,000
ℓ 吐出圧力 20 ℓ ~ 150 ℓ, 空気圧縮機 4
毎分 1 ℓ ~ 8 ℓ 吐出圧力 2 ℓ ~ 25 ℓ を始動
させ、高圧ホース 8 9 を通して、水面上の台
船 11 にセットした。油圧昇降装置 13 により降
下させた、混合気体水噴射流送ポンプ 1 水中
気体導入装置 2 が作動し、水中下の土砂・砂
ヘドロを最大水深 200 m、常用 30 m の水
深から毎分浚せつ量 0.2 ℓ ~ 1 ℓ、最大水平
流送距離 120 m、ただし 120 m を越えた
場合は、台船 11 内のゴミ取除機 12 でゴミを処
理し、スラリーポンプ 10 により、陸上の土砂

選別機 7 で、土砂・砂・ヘドロを分離して、
泥水処理機 6 処理能力毎時 40 ℓ で、ヘドロ
濁水を一次処理し、一次処理水（濁水）を水
タンク 5 に送る。送りこまれた一次処理水（
濁水）は、再度、循環高圧泥水噴射ポンプ 3
により、上記の作業を連続くりかえし、水質
を汚濁しないで浚せつをする。

本発明工法は、上記の機械システムにより、
最大水深 200 m から、水質を汚濁しないで
かつ濁水・泥水を河川などに、たれ流さない
で、連続浚せつが施工出来るのが特徴である

3. 発明の詳細な説明

第 1 図 循環高圧泥水噴射ポンプ 3. 空気圧
縮機 4. 水タンク 5. 泥水処理機 6. 土砂選
別機 7 などと水面上の台船 11 スラリーポン
プ 10 ゴミ取除機 12 油圧昇降装置 13 油圧
旋回装置 14 混合気体水噴射流送ポンプ 1.
水中気体導入装置 2 の機械システムの駆動に

(1)

(2)

第2図 混合気体水噴射流送ポンプ1.だけでは水中下の浚せつが不可能なので、従来の吸入管16に、水中気体導入装置2を取り付け、水中下でも、混合気体流送を可能にしたため水深の深いダム・湖・河川・海などで、土砂・砂・ヘドロ、その他の固形物（吸入管の90%の大きさまで）の浚せつには最適である。

第 1 図は本発明工法に係る水質汚濁防止循環混合気体水噴射ポンプ浚せつ工法の基本的構造を示す縦断平面図

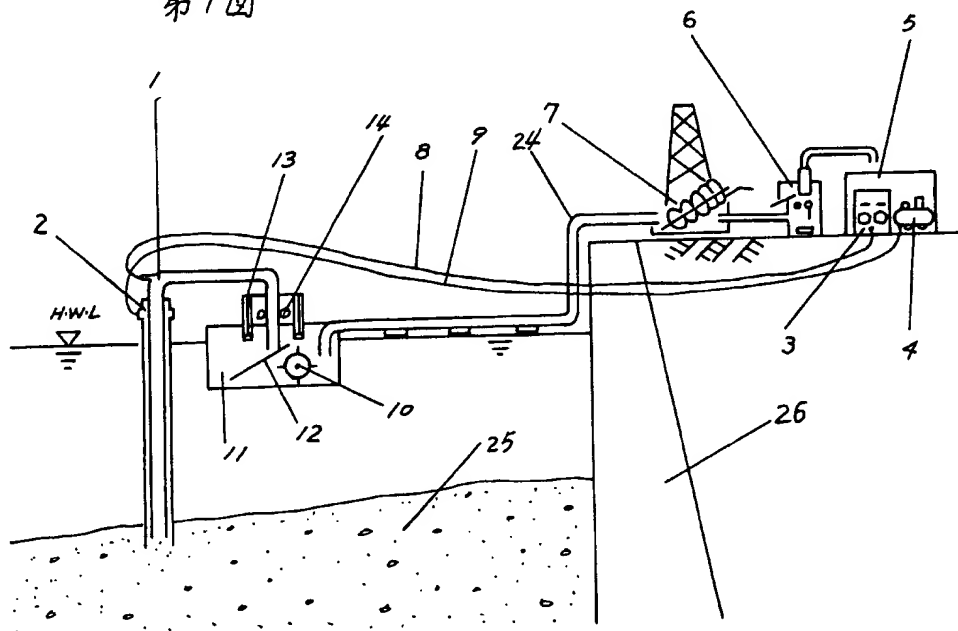
第2図は、混合気体水噴射流送ポンプと水中
気体導入装置の構造断面図

1. 混合気体水噴射流送ポンプ 2. 水中気体導入装置 3. 循環高圧泥水噴射ポンプ
4. 空気圧縮機 5. 水タンク 6. 泥水処理機
7. 土砂選別機 8. 9. 高圧ホース 10. スラリーポンプ
11. 台船 12. グミ取除機 13. 油圧升降装置
14. 油圧旋回装置 15. 気体導入室 16. 吸入口
17. 高圧泥水 18. 圧気 19. 大気（空気）
20. 泥水噴射口 21. 圧気導入口 22. 大気導入口
23. 逆止弁 24. 流送管 25. 土砂・砂・ヘドロ 26. ダム障壁（本体）

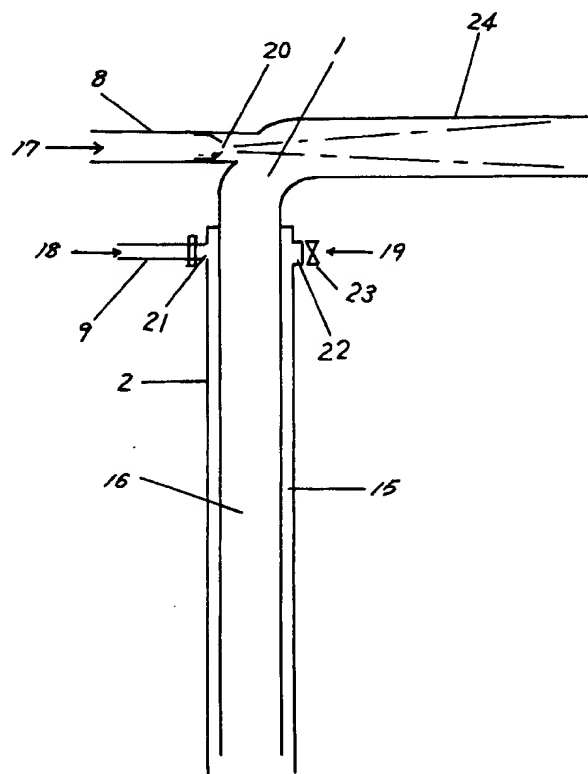
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第1回



第2図



CLIPPEDIMAGE= JP356059931A

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DOCUMENT-IDENTIFIER: JP 56059931 A

TITLE: DREDGING METHOD FOR PREVENTING WATER QUALITY FROM
CONTAMINATION USING
CIRCULATION HIGH-PRESSURE MIXTURE GAS, WATER INJECTION
PUMP

PUBN-DATE: May 23, 1981

INVENTOR-INFORMATION:

NAME

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NAME

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COUNTRY

N/A

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APPL-DATE: October 20, 1979

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US-CL-CURRENT: 37/322

ABSTRACT:

PURPOSE: To enable the re-circulation use of primary processed water
and to
simplify processing of muddy water by the use of a circulation
high-pressure
muddy water injection pump.

CONSTITUTION: With a circulation high-pressure muddy water injection
pump 3 and
an air compressor started, a mixture gas, water injection pump 1 and an
underwater gas feeding device 2, which are lowered by a hydraulic lifting
device 13, are actuated through high-pressure hoses 8 and 9, and

sediment, sand
sludge in water and at the bottom is processed in a dredging amount of
0.2m³/s; 1m³/s per minute, being pumped up from
a maximum
depth of 200m, normally a depth of 30m. Dust in the sludge is processed
by
means of a dust remover 12, and earth, sand, sludge are separated by a
slurry
pump 10 and an earth and sand selector 7. Sludge muddy water is
processed
primarily, and the operation is repeated again by means of a circulation
high-pressure muddy water injection pump 3. This permits dredging of
the sand
sludge without contaminating water quality.

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Japanese Kokai Patent Application
No. Sho 56[1981]-59931

DREDGING METHOD FOR PREVENTING WATER QUALITY FROM CONTAMINATION
USING CIRCULATION HIGH-PRESSURE MIXTURE GAS/WATER INJECTION PUMP

Shigeo Takamura

UNITED STATES PATENT AND TRADEMARK OFFICE
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DREDGING METHOD FOR PREVENTING WATER QUALITY FROM CONTAMINATION
USING CIRCULATION HIGH-PRESSURE MIXTURE GAS/WATER INJECTION PUMP

[Suishitsu odaku boshi juncan kongo kitai suifunsha ponpu shunsetsu koho]

Inventor: Shigeo Takamura

Applicant: Shigeo Takamura

[There are no amendments to this patent.]

Claim

/145*

Circulation high-pressure muddy water injection pump (3) and air compressor (4) are started at 600-2,000 L per minute at a discharge pressure of 20 kg/cm²-150 kg/cm²* and 1m³ - 6 m³ per minute at a discharge pressure of 2 kg/cm²-25 kg/cm² respectively, mixture gas/water injection pump (1) and underwater gas feeding device (2) which are lowered by hydraulic lifting device (13) set on platform (11) are actuated through high pressure hoses (8) and (9), and earth, sand, and sludge in the water and at the bottom are dredged in a dredging amount of 0.2 m³ - 1 m³ per minute and at a maximum horizontal flow distance of 120 m from a maximum depth of 200 m, normally a depth of 30 m. However, if said distance exceeds 120 m, the refuse

* [Due to the nature of the copy provided, units herein represent best guesses.]

in the sludge is processed with refuse remover (12) provided to platform (11), the earth, sand, and sludge are separated by on-land earth-sand selector (7) through slurry pump (10), the sludge muddy water is applied with primary processing in muddy water processor (6) at a processing performance of 40 m³ per hour, and the primary processed water (muddy water) is fed to water tank (5). The fed primary processed water (muddy water) is repeatedly applied with the aforementioned operation continuously by circulation high-pressure muddy water injection pump (3) and dredging is performed without contaminating the water quality.

The method in the present invention is characterized by the fact that continuous dredging can be executed with the aforementioned mechanical system from a maximum depth of 20-0 m without contaminating the water quality and without discharging the contaminated water and muddy water into a river, etc.

Detailed explanation of the invention

Referring to Figure 1, by driving a mechanical system comprised of circulation high-pressure muddy water injection pump (3), air compressor (4), water tank (5), muddy water processor (6), earth-sand selector (7), above water platform (11), slurry pump (10), refuse remover (12), hydraulic lifting device (13), hydraulic slewing gear (14), mixture gas/water injection pump (1), and underwater gas feeding device (2), earth, sand, and sludge can be dredged efficiently from a maximum underwater depth of 200 m, normally a depth of 30-80 m without contaminating the water quality and with a minimum rate of pump discharge. Also, by using circulation high-pressure muddy water injection pump (3), processing of muddy water is simplified since the primary processed water (muddy water) is circulated and reused.

Referring to Figure 2, dredging underwater is not possible with just mixture gas/water injection pump (1), hence underwater gas feeding device (2) was mounted to conventional suction pipe (16) and mixture gas flow was made possible even underwater, so it is optimal for dredging earth, sand, sludge, and other solids (size of up to 90% of the suction pipe) from deep dams, lakes, rivers, the ocean, etc.

Brief description of the figures

Figure 1 is a vertical cross section view showing the basic structure of the dredging method for preventing water quality contamination using a circulation high-pressure mixture gas water injection pump related to the method in the present invention.

Figure 2 is a cross-sectioned view for the structure of the mixture gas/water injection pump and underwater gas feeding device.

(1)...mixture gas/water injection pump, (2)...underwater gas feeding device,
(3)...circulation high-pressure muddy water injection pump, (4)...air compressor, (5)...water

tank, (6)...muddy water processor, (7)...earth-sand selector, (8), (9)...high pressure hoses, (10)...slurry pump, (11)...platform, (12)...refuse remover, (13) hydraulic lifting device, (14)...hydraulic slewing gear, (15)...gas lead-in chamber, (16)...intake port, (17)...high pressure muddy water, (18)...pressurized air, (19)...the atmosphere (air), (20)...muddy water injection port, (21)...pressurized air lead-in port, (22)...air lead-in port, (23)...check valve, (24)...flow pipe, (25)...earth, sand, sludge, (26)...dam wall (main body).

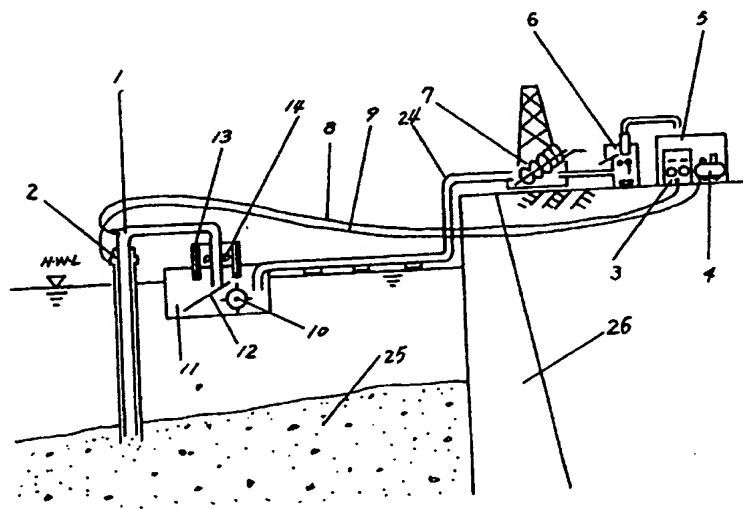


Figure 1

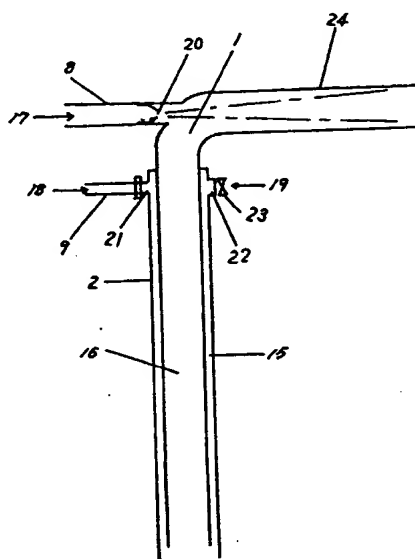


Figure 2